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Atty. Dkt. AMAT/3434/PDD/KPU1/JW
Express Mail No. EL266339302US

What Is Claimed Is:

1. A substrate, comprising:

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a) a silicon carbide layer having a dielectric constant less than 7.0 and deposited on the substrate; and

b) a first dielectric layer deposited on the silicon carbide layer *in situ* with the silicon carbide layer.

2. The substrate of claim 1, further comprising:

a) a silicon carbide etch stop deposited on the first dielectric layer *in situ* with the first dielectric layer;

b) a second dielectric layer deposited on the etch stop *in situ* with the silicon carbide etch stop.

3. The substrate of claim 2, further comprising a silicon carbide anti-reflective coating deposited on the second dielectric layer *in situ* with the second dielectric layer.

4. The substrate of claim 2, further comprising a photoresist deposited on the second dielectric layer.

5. The substrate of claim 1, further comprising a photoresist deposited on the first dielectric layer.

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6. The substrate of claim 1, further comprising:

a) a silicon carbide anti-reflective coating deposited on the first dielectric layer *in situ* with the first dielectric layer;

b) a photoresist layer deposited on the anti-reflective coating.

7. The substrate of claim 1, wherein the silicon carbide layer has a dielectric constant of about 5 or less.

8. The substrate of claim 1, wherein the substrate has an effective dielectric constant of about 5 or less.

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9. The substrate of claim 1, wherein the silicon carbide layer is produced by a process in a plasma reactor having a chamber comprising providing an organosilane flow rate of about 30 to about 500 sccm as a silicon and a carbon source and a noble gas flow rate of about 100 to about 2000 sccm and further comprising reacting the silicon and the carbon in a chamber pressure range of about 3 to about 10 Torr with an RF power source supplying a power density of about 4.3 to about 10.0 watts per square ~~centimeter~~ inch to the chamber and a substrate surface temperature of between about 200° to about 400° C.

10. The substrate of claim 3, wherein the silicon carbide layer, etch stop, and anti-reflective coating comprises silicon carbide having a dielectric constant less than 7.0.

11. The substrate of claim 3, further comprising selecting the anti-reflective coating having a thickness that produces a reflectivity of about 7 percent or less.

12. The substrate of claim 6, further comprising selecting the anti-reflective coating having a thickness that produces a reflectivity of about 7 percent or less.

13. The substrate of claim 1, wherein the substrate comprises a damascene structure.

14. A method of forming a silicon carbide layer on a substrate, comprising:

a) introducing silicon, carbon, and a noble gas into a chamber;

b) initiating a plasma in the chamber;

c) reacting the silicon and the carbon in the presence of the plasma to form silicon carbide;

d) depositing a silicon carbide layer having a dielectric constant less than 7.0 on the substrate in the chamber; and

e) depositing a first dielectric layer *in situ* with the silicon carbide layer.

15. The method of claim 14, further comprising:
   a) depositing a silicon carbide etch stop *in situ* with the first dielectric layer;
   b) depositing a second dielectric layer *in situ* with the silicon carbide etch stop.

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16. The method of claim 15, further comprising depositing a silicon carbide anti-reflective coating *in situ* with the second dielectric layer.

17. The method of claim 15, further comprising depositing a photoresist layer on the second dielectric layer.

18. The method of claim 14, further comprising depositing a photoresist layer on the first dielectric layer.

19. The method of claim 14, further comprising depositing a silicon carbide anti-reflective coating *in situ* with the first dielectric layer.

20. The method of claim 14, further comprising producing a substrate having an effective dielectric constant of no greater than about 5.

21. The method of claim 14, wherein the silicon and carbon are derived from a common organosilane, independent of other carbon sources.

22. The method of claim 14, wherein the silicon and carbon are derived from a common source, and reacting the silicon and the carbon in the presence of the plasma to form silicon carbide occurs independent of the presence of a separate hydrogen source.

23. The method of claim 14, wherein the silicon and carbon are derived from a common source and reacting the silicon and the carbon in the presence of the plasma to form silicon carbide occurs independent of the presence of a separate carbon source.

24. The method of claim 14, wherein the substrate comprises a damascene structure.

25. The method of claim 14, further comprising selecting an anti-reflective coating that has a single selected thickness to produce a reflectivity of about 7 percent or less when an underlying dielectric layer below the anti-reflective coating has a thickness from about 5000 Å to about 10000 Å.

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26. A method of *in situ* deposition of silicon carbide on a substrate, comprising:

a) depositing a silicon carbide barrier layer on the substrate;

b) depositing a first dielectric layer on the barrier layer *in situ* with the barrier layer;

c) depositing an etch stop on the first dielectric layer *in situ* with the first dielectric layer;

d) depositing a second dielectric layer on the etch stop *in situ* with the etch stop; and

e) depositing an anti-reflective coating on the second dielectric layer *in situ* with the second dielectric layer.

27. The method of claim 26, wherein the barrier layer, etch stop, and anti-reflective coating comprises silicon carbide having a dielectric constant less than 7.0.

28. The method of claim 26, further comprising producing a substrate having an effective dielectric constant of no greater than about 5.

29. The method of claim 26, further comprising removing a contaminant on a substrate layer by:

a) introducing a reducing agent comprising nitrogen and hydrogen into a chamber;

b) initiating a reducing plasma in the chamber;

c) exposing an oxide on the substrate layer to the reducing agent.

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